

Maine Department of Marine Resources

Some Life History Notes on Lobsters

Lobster Research Project

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Most lobster fishermen already know the basic life history of lobsters, but still some fishermen ask such questions as: sizes and appearance of lobsters at various stages in their life, time of year and procedure by which females become berried, how much do lobsters increase in length and weight with a shed? These types of questions come a lot easier than the answers because it takes many years of field and laboratory studies to measure and determine such things.

Berried females - approximately 50% of the females coast wide can become berried between 3-1/2 and 3-3/4 inches, gauge measure. Less than 2% of the native females will carry eggs at or below the legal minimum size, while most all females can carry eggs at 4 inches and above. This does not mean that females at any of the given sizes will necessarily have eggs at the time they are observed. The elapsed time from one egg hatching period to the next can be as short as two years but as long as 3 to 5 years for the larger females.

The average number of eggs per berried female varies as to the size of the lobster. For example, the few females that become berried around 3-3/16 inches (gauge measure) have about 10.5 thousand eggs per female; berried females at 3-1/2 inches have about 14.3 thousand eggs; those at 3-3/4 inches have about 19.4 thousand eggs; those at 4 inches have about 20.5 thousand eggs.

Before estimating total egg production, we must consider the size composition of all females in the legal size range; about 65% are between 3-3/16 and 3-1/2 inches (gauge measure), about 28% of the females are between 3-1/2 and 3-3/4 inches, and about 4% of the females are between 3-3/4 and 4 inches.

Combining the percentages of berried females and all females in the natural population gives estimates of potential egg production for the various size groups; those between 3-3/16 and 3-1/2 inches could produce 1.2 billion eggs, those between 3-1/2 and 3-3/4 inches could produce 2.3 billion eggs, while those between 3-3/4 and 4 inches could produce only 0.22 billion eggs. Obviously the greatest egg production occurs between 3-1/2 and 3-3/4 inches, gauge measure.

The male lobster (which matures at smaller sizes than females) mates the female lobster when she is usually in the soft condition after shedding. He does this by rolling the female on her back and secretes his sperm into the female by inserting his modified first pair of swimmerets into a sack on the underside of the female between the third and fourth pair of walking legs (Figure 1).

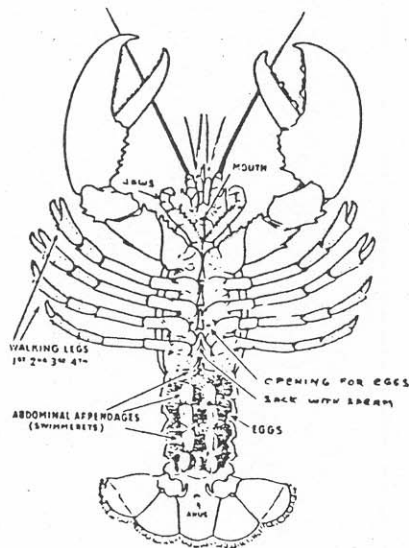


Figure 1. Bottom side of berried female lobster showing various parts of anatomy discussed in the report (from Goggins, Dow, Harriman).

Observations have shown that a female usually prefers a slightly larger male than herself for mating and protective purposes while she is in the soft condition. She attracts the male by emitting a special chemical into the water. Other females and predators would consider her a tasty morsel if she were left unprotected until her shell becomes more firm in 10 to 20 days (depending on the type of food she eats). Of course the immature females and males shed too, but they usually fend for themselves by hiding in burrows or crevices during the molt.

The female lobster becomes berried in the early summer by taking a position on her back to allow the eggs to pass from the opening at the base of the second pair of walking legs, over the sack where the male placed his sperm 9-12 months earlier (Figure 2).

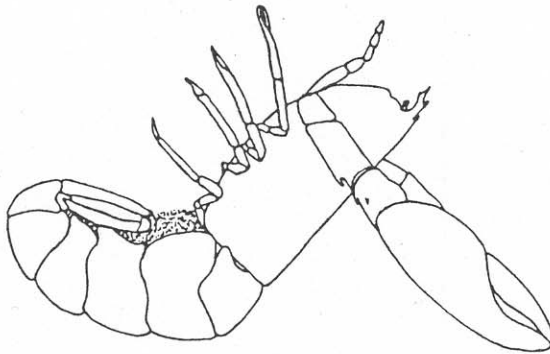


Figure 2. Typical egg laying position for female lobster as eggs are attached under the tail (by Parkhurst).

Then the fertilized eggs become sticky and are attached by gravity and her walking legs to the swimmerets along the underside of the tail. After she

carries the eggs for approximately 10 months, the female takes another typical position for the eggs to hatch off (Figure 3).

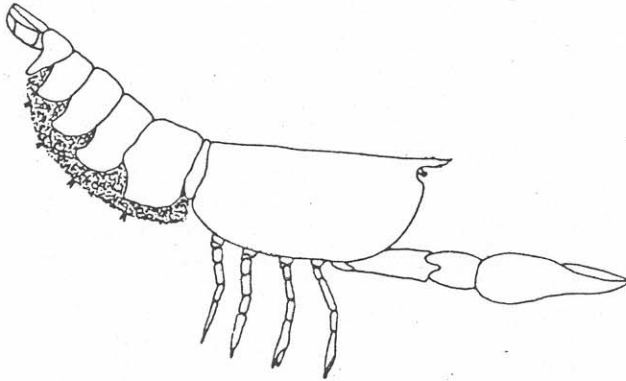


Figure 3. Typical egg hatching (egging off) position of berried female (by Parkhurst).

Larval lobsters - the eggs hatch from a female over a 1 to 2 day period and this first stage from hatching does not look like an adult lobster (Figure 4). In fact, the larval lobsters have double so-called walking legs; the extra set with hair-like projections allows the larval lobsters to swim in the upper water column, near or at the surface, from 15 to 25 days. These larvae shed about 4 times (also called stages) during this time period. The 5th stage lobsters settle to the bottom and greatly resemble the adult lobster (Figure 5). These larval lobsters have increased in total length from about $\frac{3}{16}$ of an inch at hatching to $\frac{3}{8}$ of an inch at the 5th stage.

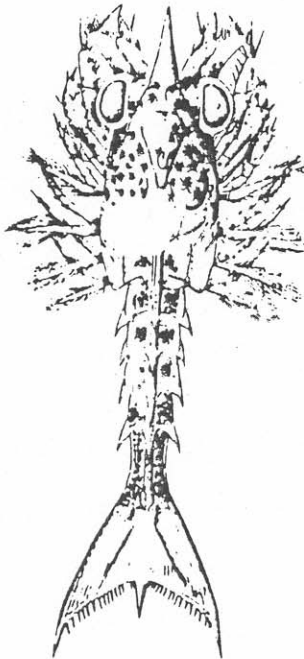


Figure 4. Lobster larvae immediately after hatching from egg, showing double pairs of walking legs. Notice scale of actual total length at the lower right (from Herrick).

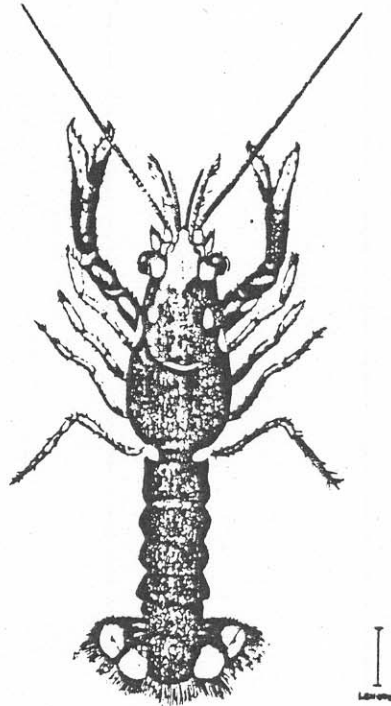


Figure 5. Small lobster after 5 sheds when it descends to the ocean bottom. Notice scale of actual total length at the lower right (from Herrick).

The newly arrived bottom dwellers are very secretive. They live in burrows around and under sand, mud, gravel, rocks and boulders, sometimes in association with marine vegetation. We've located and studied these lobsters in some exposed areas between high and low tide. Of course they're found in other areas not exposed by the tide, but the so-called "intertidal zone" provides us with a site that we can readily sample.

Food of lobsters - larval lobsters in the upper water column feed on tiny animals and plants, not excluding eating each other. Once these lobsters are on the bottom, they will readily attack and eat isopods and amphipods (small shrimp-like animals, example: sea fleas) that live in the same area. In fact, we have observed these small lobsters stalk and devour amphipods that are twice the size of the lobster.

Lobsters from about 2 inches, gauge measure, and above feed on many types of crabs, snails, marine worms, clams (soft-shell especially), fish, marine plants, even sea urchins (ladies-of-the-evening eggs, to put it politely).

Growth of lobsters - as already discussed, larval lobsters increase from about $\frac{3}{16}$ of an inch, total length, at hatching to $\frac{3}{8}$ of an inch at the 5th stage. A lobster goes through approximately 25 molts (sheds) from the 1st larval stage to the legal minimum size of $3\frac{3}{16}$ inches, gauge measure, within a time span of 5 to 7 years. Lobsters immediately below and within the legal size range increase about 14% in length and about 40% in weight for each molt. This means that a lobster at $3\frac{3}{16}$ inches will increase to $3\frac{5}{8}$ inches in gauge length, while increasing in weight from about 1 pound to approximately $1\frac{3}{8}$ pounds.

Hopefully, the above information clarifies some aspects of basic life history of lobsters. It becomes more difficult when we quantify and analyze these and other observations on lobsters which lead to the core of fisheries science for maximum benefit to the fishermen and the lobster resource.